

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Withdrawn) A core-shell nanoparticle having a core comprising at least one first transition metal-containing material and at least one shell layer comprising at least one second transition metal-containing material.
2. (Withdrawn) The core-shell nanoparticle according to claim 1, wherein the first transition metal and the second transition metal are different.
3. (Withdrawn) The core-shell nanoparticle according to claim 1, wherein the first transition metal and the second transition metal are independently selected from the group consisting of Fe, Co, Ni, Cr, Mn, Ce, V, Nd, Nb, Gd, La, Ta, Pr, Eu, Hf, Er, Pt, Au, Ag, Cu, Pd and Sm.
4. (Withdrawn) The core-shell nanoparticle according to claim 1, wherein the core consists of a transition metal.
5. (Withdrawn) The core-shell nanoparticle according to claim 1, wherein the at least one first transition metal-containing material is selected from the group consisting of Pt, Fe₃Pt, FePt, FePt₃, PtCo, Pt₃Co, Co and SmCo₅.
6. (Withdrawn) The core-shell nanoparticle according to claim 1, wherein the at least one second transition metal-containing material is a metal or metal oxide.
7. (Withdrawn) The core-shell nanoparticle according to claim 6, wherein the metal or metal oxide is selected from the group consisting of Co, Fe, Fe₂O₃, Fe₃O₄, FeO, CoO, Gd₂O₃, CrO₂ and NiO.
8. (Withdrawn) The core-shell nanoparticle according to claim 6, wherein the metal or metal oxide is Fe₂O₃ or CoO.

9. (Withdrawn) The core-shell nanoparticle according to claim 1, wherein the core is about 1 to about 15 nm in diameter.
10. (Withdrawn) The core-shell nanoparticle according to claim 1, wherein the core is about 4 to about 10 nm in diameter.
11. (Withdrawn) The core-shell nanoparticle according to claim 1, wherein the shell layer is about 0.1 to about 10 nm in thickness.
12. (Withdrawn) The core-shell nanoparticle according to claim 1, wherein the shell layer is about 3 to about 5.4 nm in thickness.
13. (Withdrawn) The core-shell nanoparticle according to claim 1, wherein the core-shell nanoparticle is selected from the group consisting of Pt@Fe₂O₃, FePt@Fe, Pt₃Co@Fe₂O₃, Pt₃Co@Co@Fe₂O₃, Co@Fe₂O₃, SmCo₅@Fe₂O₃ and MCo₅@Fe₂O₃ (M= La, Ce, Pr or Nd).
14. (Currently Amended) A method of forming nanoparticles, comprising:
forming a solution of a reducing agent and a solvent under an inert gas;
heating the solution to reflux;
adding a metal salt or organic metallic compound to the solution to form nanoparticle cores;
adding an organometallic compound to the solution and heating to form first core-shell nanoparticles by forming one or more shell layers over the nanoparticle cores; and
heating the first core-shell nanoparticles to form the nanoparticles, the nanoparticles being ~~different from the core-shell nanoparticles~~ selected from the group consisting of pure alloy nanoparticles and second core-shell nanoparticles, the second core-shell nanoparticles having cores or shells that differ in composition from respective cores or shells of the first core-shell nanoparticles.

15. (Original) The method according to claim 14, wherein the reducing agent comprises a 1,2-diol.

16. (Original) The method according to claim 15, wherein the 1,2-diol is selected from the group consisting of 1,2-hexanediol, 1,2-octanediol, 1,2-decanediol, 1,2-dodecanediol, and ethylene glycol.

17. (Original) The method according to claim 14, wherein the solvent is selected from the group consisting of octylether, phenylether and dichlorobenzene.

18. (Original) The method according to claim 14, wherein heating to reflux comprises heating to a temperature ranging between about 150 °C to about 300 °C.

19. (Original) The method according to claim 14, wherein the metal salt is selected from the group consisting of $\text{Pt}(\text{CH}_3\text{COCHCOCH}_3)_2$, $\text{Fe}(\text{CH}_3\text{COCHCOCH}_3)_3$, $\text{Co}(\text{CH}_3\text{COCHCOCH}_3)_2$, $\text{Sm}(\text{CH}_3\text{COCHCOCH}_3)_3$, $\text{Ag}(\text{CF}_3\text{COO})$ and FeCl_2 .

20. (Original) The method according to claim 14, wherein the organometallic compound comprises at least one member selected from the group consisting of $\text{Fe}(\text{CO})_5$, $\text{Fe}_2(\text{CO})_9$, $\text{Fe}_3(\text{CO})_{12}$, $\text{Co}_2(\text{CO})_8$ and $\text{Co}_4(\text{CO})_{12}$, and $\text{Ni}(\text{CO})_4$.

21. (Original) The method according to claim 14, wherein a molar ratio of the metal salt or organic metallic compound to the organometallic compound is in a range of from about 10:1 to about 1:10.

22. (Original) The method according to claim 14, wherein a molar ratio of the metal salt or organic metallic compound to the organometallic compound is in a range of from about 3:1 to about 1:5.

23. (Previously Presented) A method of forming magnetic alloy nanoparticles, comprising:

forming a solution of a reducing agent and a solvent under an inert gas;

heating the solution to reflux;

adding a metal salt or organic metallic compound to the solution to form nanoparticle cores;

adding an organometallic compound to the solution and heating to form core-shell nanoparticles by forming one or more shell layers over the nanoparticle cores;

transferring the core-shell nanoparticles to a substrate; and

thermally annealing the core-shell nanoparticles on the substrate to reduce the one or more shell layers and form exchange coupled magnetic alloy nanoparticles.

24. (Original) The method according to claim 23, wherein the reducing agent comprises a 1,2-diol.

25. (Original) The method according to claim 23, wherein the core-shell nanoparticles are transferred to the substrate by Langmuir-Blodgett deposition.

26. (Original) The method according to claim 23, wherein the core-shell nanoparticles are transferred to the substrate by drop casting.

27. (Previously Presented) The method according to claim 23, wherein thermally annealing the core-shell nanoparticles takes place at a temperature ranging between about 400 °C to 650 °C.

28. (Previously Presented) A method of forming a magnetic alloy nanoparticle film, comprising:

forming a solution of a 1,2-diol reducing agent and a solvent under an inert gas;

heating the solution to reflux;

adding a metal salt or an organometallic compound to the solution to form nanoparticle cores;

then adding an organometallic compound to the solution and continuing to heat to form core-shell nanoparticles by forming one or more shell layers over the nanoparticle cores;

transferring the core-shell nanoparticles to a substrate;

thermally annealing the core-shell nanoparticles to reduce the one or more shell layers and form an exchange coupled magnetic alloy thin film.

29. (Original) The method according to claim 28, wherein the reducing agent comprises a 1,2-diol.

30. (Original) The method according to claim 28, wherein the reducing agent comprises a 1,2-hexadecanediol.

31. (Original) The method according to claim 28, wherein the core-shell nanoparticles are transferred to the substrate by Langmuir-Blodgett deposition.

32. (Original) The method according to claim 28, wherein the core-shell nanoparticles are transferred to the substrate by drop casting.

33. (Previously Presented) The method according to claim 28, wherein thermally annealing the core-shell nanoparticles takes place at a temperature ranging between about 400 °C to 650 °C.

34. (Original) The method according to claim 28, wherein the exchange coupled magnetic alloy is Fe₃Pt-FePt.

35. (Original) The method according to claim 28, wherein the exchange coupled magnetic alloy is FePt-Fe.

36. (Original) The method according to claim 28, wherein the exchange coupled magnetic alloy is PtCo-FeCo.

37. (Previously Presented) A method of forming an alloy magnet, comprising:
forming a solution of a reducing agent and a solvent under an inert gas;

heating the solution to reflux;
adding a metal salt to the solution to form nanoparticle cores;
adding an organometallic compound to the solution and heating to form core-shell nanoparticles by forming one or more shell layers over the nanoparticle cores;
transferring the core-shell nanoparticles to a substrate; and
thermally annealing the core-shell nanoparticles to reduce the one or more shell layers and form an exchange coupled alloy magnet.

38. (Original) The method according to claim 37, wherein the reducing agent comprises a 1,2-diol.

39. (Original) The method according to claim 37, wherein the reducing agent comprises a 1,2-hexadecanediol.

40. (Original) The method according to claim 37, wherein the exchange coupled magnetic alloy is $\text{Fe}_3\text{Pt-FePt}$.

41. (Original) The method according to claim 37, wherein the exchange coupled magnetic alloy is FePt-Fe .

42. (Original) The method according to claim 37, wherein the exchange coupled magnetic alloy is PtCo-FeCo .

43. (Currently Amended) A method of forming ~~core-shell~~ nanoparticles, comprising:

forming a solution of a reducing agent and a solvent under an inert gas;
heating the solution to reflux;
adding a metal salt to the solution to form nanoparticle cores;
adding an organometallic compound to the solution and heating to form first core-shell nanoparticles by forming one or more shell layers over the nanoparticle cores;
transferring the first core-shell nanoparticles to a substrate; and

thermally annealing the first core-shell nanoparticles to reduce the one or more shell layers and form ~~second core-shell~~ the nanoparticles, the ~~second core-shell~~ nanoparticles being ~~different from the first core-shell nanoparticles~~ selected from the group consisting of pure alloy nanoparticles and second core-shell nanoparticles, the second core-shell nanoparticles having cores or shells that differ in composition from respective cores or shells of the first core-shell nanoparticles.

44. (Original) The method according to claim 43, wherein the reducing agent comprises a 1,2-diol.

45. (Original) The method according to claim 43, wherein the reducing agent comprises a 1,2-hexadecanediol.

46. (Currently Amended) The method according to claim 43, wherein the ~~second core-shell~~ nanoparticles are selected from the group consisting of FePt@Fe, CoPt@CoO and CoPt@CoFe.